

## WHAT IS CLAIMED IS:

- 1                   1.     An isolated antibody that binds specifically to a stalk of CD30 (SEQ  
2 ID NO:1) of a cell, or to an epitope destroyed upon cleavage of soluble CD30 ("sCD30")  
3 from intact CD30.
- 1                   2.     An antibody of claim 1, wherein said antibody is selected from the  
2 group consisting of an Fab, a single chain variable region ("scFV"), and a disulfide stabilized  
3 recombinant variable region ("dsFv").
- 1                   3.     An antibody of claim 1, which binds to a peptide selected from the  
2 group consisting of: residues 329 to 379 of SEQ ID NO:1, residues 339 to 379 of SEQ ID  
3 NO:1, residues 349 to 379 of SEQ ID NO:1, residues 359 to 379 of SEQ ID NO:1, and  
4 residues 369 to 379 of SEQ ID NO:1.
- 1                   4.     An antibody of claim 1, which binds to an epitope of CD30 mapping to  
2 Epitope IIa or Epitope VI of CD30 (SEQ ID NO:1).
- 1                   5.     An antibody of claim 4, which has the complementarity determining  
2 regions ("CDRs") of antibody T105, as shown in Figures 2a and b.
- 1                   6.     An antibody of claim 1, which has the complementarity determining  
2 regions ("CDRs") of antibody T201, as shown in Figures 2a and b.
- 1                   7.     A composition comprising an antibody of claim 1, conjugated or fused  
2 to a therapeutic moiety.
- 1                   8.     A composition comprising an antibody of claim 3, conjugated or fused  
2 to a therapeutic moiety.
- 1                   9.     A composition comprising an antibody of claim 4, conjugated or fused  
2 to a therapeutic moiety.
- 1                   10.    A composition comprising an antibody of claim 5, conjugated or fused  
2 to a therapeutic moiety.
- 1                   11.    A composition comprising an antibody of claim 6, conjugated or fused  
2 to a therapeutic moiety.

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1                   12.    A composition of claim 7, wherein the therapeutic moiety is selected  
2   from the group consisting of a cytotoxin, a drug, a radioisotope, or a liposome loaded with a  
3   drug or a cytotoxin.

1                   13.    A composition of claim 8, wherein the therapeutic moiety is selected  
2   from the group consisting of a cytotoxin, a drug, a radioisotope, or a liposome loaded with a  
3   drug or a cytotoxin

1                   14.    A composition of claim 9, wherein the therapeutic moiety is selected  
2   from the group consisting of a cytotoxin, a drug, a radioisotope, or a liposome loaded with a  
3   drug or a cytotoxin.

1                   15.    A composition of claim 10, wherein the therapeutic moiety is selected  
2   from the group consisting of a cytotoxin, a drug, a radioisotope, or a liposome loaded with a  
3   drug or a cytotoxin.

1                   16.    A composition of claim 11, wherein the therapeutic moiety is selected  
2   from the group consisting of a cytotoxin, a drug, a radioisotope, or a liposome loaded with a  
3   drug or a cytotoxin.

1                   17.    A composition of claim 15, wherein the cytotoxin is selected from the  
2   group consisting of ricin A, abrin, ribotoxin, ribonuclease, saporin, calicheamycin, diphtheria  
3   toxin, a *Pseudomonas* exotoxin, and botulinum toxins A through F.

1                   18.    A composition of claim 12, wherein the cytotoxin is selected from the  
2   group consisting of ricin A, abrin, ribotoxin, ribonuclease, saporin, calicheamycin, diphtheria  
3   toxin, a *Pseudomonas* exotoxin, and botulinum toxins A through F.

1                   19.    A composition of claim 18, wherein said *Pseudomonas* exotoxin is  
2   selected from the group consisting of PE35, PE38, PE38KDEL, PE40, PE4E, and PE38QQR.

1                   20.    A composition of claim 7, further comprising a pharmaceutically  
2   acceptable carrier.

1                   21.    A use of an anti-CD30 antibody that binds specifically to a stalk of  
2   CD30 (SEQ ID NO:1) of a cell, or to an epitope destroyed upon cleavage of sCD30 from

3 intact CD30, for the manufacture of a medicament to inhibit the growth of a CD30+ cancer  
4 cell.

1 22. A use of claim 21, wherein said antibody is selected from the group  
2 consisting of an scFv, dsFv, a Fab, or a F(ab')<sub>2</sub>.

1 23. A use of a composition, which composition comprises an antibody of  
2 claim 1 conjugated or fused to a therapeutic moiety, for the manufacture of a medicament for  
3 inhibiting growth of a CD30+ cancer cell.

1 24. A use of claim 23, wherein the therapeutic moiety is selected from the  
2 group consisting of a cytotoxin, a drug, a radioisotope, or a liposome loaded with a drug or a  
3 cytotoxin.

1 25. A use of claim 24, wherein said cytotoxin is a *Pseudomonas* exotoxin.

1 26. A use of claim 25, wherein the *Pseudomonas* exotoxin is PE38.

1 27. A nucleic acid encoding an antibody that binds specifically to a stalk of  
2 CD30 (SEQ ID NO:1) of a cell, or to an epitope destroyed upon cleavage of sCD30 from  
3 intact CD30.

1 28. A nucleic acid of claim 27, wherein said antibody binds to an epitope  
2 of CD30 selected from Epitope IIa and VI.

1 29. A nucleic acid of claim 27, further wherein said nucleic acid encodes a  
2 polypeptide which is a therapeutic moiety.

1 30. An expression vector comprising a nucleic acid of claim 27 operably  
2 linked to a promoter.

1 31. An expression vector comprising a nucleic acid of claim 28, operably  
2 linked to a promoter.

1 32. An expression vector comprising a nucleic acid of claim 29 operably  
2 linked to a promoter.

1 33. A method of inhibiting growth of a CD30+ cancer cell by contacting  
2 said cell with an antibody that binds specifically to a stalk of CD30 (SEQ ID NO:1) of a cell,

3 or to an epitope destroyed upon cleavage of sCD30 from intact CD30, which antibody is  
4 fused or conjugated to a therapeutic moiety, which therapeutic moiety inhibits growth of said  
5 cell.

1 34. A method of claim 33, wherein said antibody is selected from the  
2 group consisting of an scFv, a dsFv, a Fab, or a F(ab')<sub>2</sub>.

1 35. A method of claim 33, wherein said antibody binds to an epitope  
2 selected from the group consisting of Epitope IIa and VI.

1 36. A method of claim 33, wherein the therapeutic moiety is selected from  
2 the group consisting of a cytotoxin, a drug, a radioisotope, or a liposome loaded with a drug  
3 or a cytotoxin. therapeutic moiety is a cytotoxin.

1 37. A method of claim 36, wherein the cytotoxin is selected from the  
2 group consisting of ricin A, abrin, ribotoxin, ribonuclease, saporin, calicheamycin, diphtheria  
3 toxin, a *Pseudomonas* exotoxin, and botulinum toxins A through F.

1 38. An anti-CD30 antibody, wherein said antibody comprises a sequence  
2 of at least one complementarity determining region ("CDR") shown in Figure 2 of a sequence  
3 selected from the group consisting of SEQ ID NO:2, SEQ ID NO:4, SEQ ID NO:7, SEQ ID  
4 NO:14, SEQ ID NO:15, SEQ ID NO:17, SEQ ID NO:22, SEQ ID NO:29, SEQ ID NO:38  
5 and SEQ ID NO:39.

1 39. An anti-CD30 antibody of claim 38, wherein the antibody has a  
2 variable heavy chain and a variable light chain, which chains have sequences selected from  
3 the group consisting of: a variable heavy chain of SEQ ID NO:2 and a variable light chain of  
4 SEQ ID NO:15 (antibody T6); a variable heavy chain having the sequence of SEQ ID NO:4  
5 and a variable light chain having the sequence of SEQ ID NO:17 (antibody T13); a variable  
6 heavy chain of SEQ ID NO:7 and a variable light chain of SEQ ID NO:22 (antibody T25), a  
7 variable heavy chain of SEQ ID NO:14 and a variable light chain of SEQ ID NO:29  
8 (antibody T105), and a variable heavy chain of SEQ ID NO:38 and a variable light chain of  
9 SEQ ID NO:39 (antibody T201).

1 40. An antibody of claim 38 wherein the antibody is a disulfide stabilized  
2 recombinant variable region ("dsFv").

1                   41.     An antibody of claim 39 wherein the antibody is a disulfide stabilized  
2 recombinant variable region ("dsFv").

1                   42.     A composition comprising an antibody of claim 38, conjugated or  
2 fused to a therapeutic moiety.

1                   43.     A composition of claim 42, wherein the therapeutic moiety is selected  
2 from the group consisting of a cytotoxin, a drug, a radioisotope, or a liposome loaded with a  
3 drug and a cytotoxin.

1                   44.     A composition of claim 43, wherein the cytotoxin is selected from the  
2 group consisting of ricin A, abrin, ribotoxin, ribonuclease, saporin, calicheamycin, diphtheria  
3 toxin, a *Pseudomonas* exotoxin, and botulinum toxins A through F.

1                   45.     A composition of claim 44, wherein said cytotoxin is a *Pseudomonas*  
2 exotoxin selected from the group consisting of PE35, PE38, PE38KDEL, PE40, PE4E, and  
3 PE38QQR.

1                   46.     A use of an anti-CD30 antibody, wherein said antibody comprises of at  
2 least one complementarity determining region ("CDR") shown in Figure 2 of a sequence  
3 selected from the group consisting of SEQ ID NO:2, SEQ ID NO:4, SEQ ID NO:7, SEQ ID  
4 NO:14, SEQ ID NO:15, SEQ ID NO:17, SEQ ID NO:22, SEQ ID NO:29, SEQ ID NO:38  
5 and SEQ ID NO:39 for the manufacture of a medicament to inhibit the growth of a CD30+  
6 cancer cell.

1                   47.     A use of claim 46, wherein said antibody is a dsFv.

1                   48.     A use of a composition for the manufacture of a medicament for  
2 inhibiting growth of a CD30+ cancer cell, which composition comprises an antibody of claim  
3 46 conjugated or fused to a therapeutic moiety.

1                   49.     A use of claim 48, wherein the therapeutic moiety is selected from the  
2 group consisting of a cytotoxin, a drug, a radioisotope, or a liposome loaded with a drug and  
3 a cytotoxin.

1                   50.    A use of claim 49, wherein the cytotoxin is selected from the group  
2   consisting of ricin A, abrin, ribotoxin, ribonuclease, saporin, calicheamycin, diphtheria toxin,  
3   a *Pseudomonas* exotoxin, and botulinum toxins A through F.

1                   51.    A use of claim 50, wherein said *Pseudomonas* exotoxin is selected  
2   from the group consisting of PE35, PE38, PE38KDEL, PE40, PE4E, and PE38QQR.

1                   52.    A nucleic acid encoding an anti-CD30 antibody, wherein said encoded  
2   antibody comprises one or more complementarity determining regions ("CDRs") as set forth  
3   in Figure 2 of a variable heavy or variable heavy chain selected from the group consisting of:  
4   SEQ ID NO:2, SEQ ID NO:4, SEQ ID NO:7, SEQ ID NO:14, SEQ ID NO:15, SEQ ID  
5   NO:17, SEQ ID NO:22, SEQ ID NO:29, SEQ ID NO:38 and SEQ ID NO:39.

1                   53.    A nucleic acid of claim 52, wherein said antibody is a dsFv.

1                   54.    A nucleic acid of claim 52, further wherein said nucleic acid encodes a  
2   polypeptide which is a therapeutic moiety.

1                   55.    A nucleic acid of claim 54, further wherein said therapeutic moiety is a  
2   drug or a cytotoxin.

1                   56.    A nucleic acid of claim 55, further wherein said cytotoxin is a  
2   *Pseudomonas* exotoxin.

1                   57.    An expression vector comprising a nucleic acid of claim 52 operably  
2   linked to a promoter.

1                   58.    An expression vector comprising a nucleic acid of claim 55, operably  
2   linked to a promoter.

1                   59.    A method of inhibiting growth of a CD30+ cancer cell by contacting  
2   said cell with an antibody having at least one complementarity determining region as shown  
3   in Figure 2 of a variable heavy or variable light chain selected from the group consisting of  
4   SEQ ID NO:2, SEQ ID NO:4, SEQ ID NO:7, SEQ ID NO:14, SEQ ID NO:15, SEQ ID  
5   NO:17, SEQ ID NO:22, SEQ ID NO:29, SEQ ID NO:38 and SEQ ID NO:39, which antibody  
6   is fused or conjugated to a therapeutic moiety, which therapeutic moiety inhibits growth of  
7   said cell.

1                   60.     A method of claim 59, wherein said antibody is a dsFv.

1                   61.     A method of claim 59, wherein said therapeutic moiety is selected  
2 from the group consisting of a cytotoxin, a drug, a radioisotope, or a liposome loaded with a  
3 drug and a cytotoxin.

1                   63.     A method of claim 61, wherein the cytotoxin is selected from the  
2 group consisting of ricin A, abrin, ribotoxin, ribonuclease, saporin, calicheamycin, diphtheria  
3 toxin, a *Pseudomonas* exotoxin, and botulinum toxins A through F.

1                   64.     A method for detecting the presence of a CD30+ cell in a biological  
2 sample, said method comprising:

3                   (a)     contacting cells of said biological sample with an anti-CD30 antibody  
4 selected from the group consisting of: an antibody that binds specifically to a stalk of CD30  
5 (SEQ ID NO:1) of a cell, or to an epitope destroyed upon cleavage of sCD30 from intact  
6 CD30, and an antibody having at least one complementarity determining region as shown in  
7 Figure 2 of a variable heavy chain or variable light chain selected from the group consisting  
8 of SEQ ID NO:2, SEQ ID NO:4, SEQ ID NO:7, SEQ ID NO:14, SEQ ID NO:15, SEQ ID  
9 NO:17, SEQ ID NO:22, SEQ ID NO:29, SEQ ID NO:38 and SEQ ID NO:39, said antibody  
10 being fused or conjugated to a detectable label; and,

11                   (b)     detecting the presence or absence of said label,  
12 wherein detecting the presence of said label indicates the presence of a CD30+ cell in said  
13 sample.

1                   65.     A method of claim 64, wherein said antibody is selected from the  
2 group consisting of an scFv, a dsFv, a Fab, or a F(ab')<sub>2</sub>.

1                   66.     An antibody having at least one variable heavy chain or variable light  
2 chain selected from the group consisting of SEQ ID NO:6, SEQ ID NO:11, SEQ ID NO:12,  
3 SEQ ID NO:13, SEQ ID NO:21, SEQ ID NO:26, SEQ ID NO:27, SEQ ID NO:28, SEQ ID  
4 NO:40, and SEQ ID NO:41.

1                   67.     An antibody of claim 66, wherein said antibody has a variable heavy  
2 chain and a variable light chain selected from the group consisting of: (a) SEQ ID NO:6, and  
3 SEQ ID NO:21 (antibody T24), (b) SEQ ID NO:11 and SEQ ID NO:26 (antibody T420), (c)

4 SEQ ID NO:12 and SEQ ID NO:27 (antibody T427), (d) SEQ ID NO:13 and SEQ ID NO:28  
5 (antibody T405), and (e) SEQ ID NO:40 and SEQ ID NO:41 (antibody T408).

1 68. A composition comprising an antibody of claim 66 and a  
2 pharmaceutically acceptable carrier.

1 69. A composition of an antibody of claim 67 and a pharmaceutically  
2 acceptable carrier.

1 70. Use of an antibody of claim 66 for the manufacture of a medicament to  
2 inhibit the growth of cancer cells expressing CD30.

1 71. A method for inhibiting the growth of cancer cells expressing CD30,  
2 said method comprising administering to a patient having a CD30-expressing cancer a  
3 therapeutically effective amount of an antibody having at least one variable heavy chain or  
4 variable light chain selected from the group consisting of SEQ ID NO:6, SEQ ID NO:11,  
5 SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:21, SEQ ID NO:26, SEQ ID NO:27, SEQ ID  
6 NO:28, SEQ ID NO:40, and SEQ ID NO:41.

1 72. A method for inhibiting the growth of cancer cells expressing CD30,  
2 said method comprising administering to a patient having a CD30-expressing cancer a  
3 therapeutically effective amount of an antibody having the complementarity determining  
4 regions ("CDRs") of variable heavy and variable light chains selected from the group  
5 consisting of (a) SEQ ID NO:6, and SEQ ID NO:21 (antibody T24), (b) SEQ ID NO:11 and  
6 SEQ ID NO:26 (antibody T420), (c) SEQ ID NO:12 and SEQ ID NO:27 (antibody T427), (d)  
7 SEQ ID NO:13 and SEQ ID NO:28 (antibody T405), and (e) SEQ ID NO:40 and SEQ ID  
8 NO:41 (antibody T408).

1 73. Use of an antibody having at least one complementarity-determining  
2 region of a mouse monoclonal antibody designated as AC10 for the manufacture of a  
3 medicament to inhibit the growth of cancer cells expressing CD30.

1 74. A use of claim 73, wherein the antibody has variable heavy and  
2 variable light chains as in antibody AC10.

1 75. A method for inhibiting the growth of cancer cells expressing CD30,  
2 said method comprising administering to a patient having a CD30-expressing cancer a



3 therapeutically effective amount of antibody having at least one complementarity-  
4 determining region ("CDR") of a mouse monoclonal antibody designated as AC10.

1 76. A method of claim 75, wherein the CDRs of the variable heavy and  
2 variable light chains of said antibody are as in antibody AC10.

1 77. A method of claim 76, wherein the variable heavy and variable light  
2 chains of said antibody are as in antibody AC10.

1 78. An isolated nucleic acid encoding an antibody having the  
2 complementarity determining regions ("CDRs") of variable heavy and variable light chains  
3 selected from the group consisting of (a) SEQ ID NO:6, and SEQ ID NO:21 (antibody T24),  
4 (b) SEQ ID NO:11 and SEQ ID NO:26 (antibody T420), (c) SEQ ID NO:12 and SEQ ID  
5 NO:27 (antibody T427), (d) SEQ ID NO:13 and SEQ ID NO:28 (antibody T405), and (e)  
6 SEQ ID NO:40 and SEQ ID NO:41 (antibody T408).

1 79. An isolated nucleic acid encoding an antibody having variable heavy  
2 and variable light chains selected from the group consisting of (a) SEQ ID NO:6, and SEQ ID  
3 NO:21 (antibody T24), (b) SEQ ID NO:11 and SEQ ID NO:26 (antibody T420), (c) SEQ ID  
4 NO:12 and SEQ ID NO:27 (antibody T427), (d) SEQ ID NO:13 and SEQ ID NO:28  
5 (antibody T405), and (e) SEQ ID NO:40 and SEQ ID NO:41 (antibody T408).

1 80. A host cell expressing an isolated nucleic acid encoding an antibody  
2 having variable heavy and variable light chains selected from the group consisting of (a) SEQ  
3 ID NO:6, and SEQ ID NO:21 (antibody T24), (b) SEQ ID NO:11 and SEQ ID NO:26  
4 (antibody T420), (c) SEQ ID NO:12 and SEQ ID NO:27 (antibody T427), (d) SEQ ID NO:13  
5 and SEQ ID NO:28 (antibody T405), and (e) SEQ ID NO:40 and SEQ ID NO:41 (antibody  
6 T408).

1 81. A kit for detecting the presence of a CD30+ cancer cell in a biological  
2 sample, said kit comprising:

3 (a) a container, and

4 (b) an anti-CD30 antibody selected from the group consisting of: an  
5 antibody that binds specifically to a stalk of CD30 (SEQ ID NO:1) of a cell, or to an epitope  
6 destroyed upon cleavage of sCD30 from intact CD30, and an antibody that has at least one  
7 complementarity determining region having a sequence shown in Figures 2 and 6 of SEQ ID

8 NO:2, SEQ ID NO:4, SEQ ID NO:7, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:17, SEQ  
9 ID NO:22, SEQ ID NO:29, SEQ ID NO:38 and SEQ ID NO:39, which anti-CD30 antibody is  
10 fused or conjugated to a detectable label.

1 82. A kit of claim 81, wherein said antibody is selected from the group  
2 consisting of an scFv, a dsFv, a Fab, or a F(ab')<sub>2</sub>.

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